

CLAIMS

1. Assembly allowing the manufacture of a hollow mechanical part by diffusion bonding and superplastic forming, comprising:

- a stack of at least two primary parts having two faces and a periphery, the said primary parts being joined together around their said periphery with the exception of a place forming a passage so as to define between the two of them a cavity, and the said primary parts having, facing the said cavity, at least one face that is covered, in a pattern, with a stop-off product containing a binder that can be thermally degraded; and

- a sealed reservoir having an internal space and an open end, the said end being joined in a sealed manner to the said passage in the said stack so as to allow communication between the said internal space of the said reservoir and the said cavity, the reservoir being placed under a partial vacuum, this being produced so as to be non-deformable at the temperature and at the pressure at which the diffusion bonding of the said stack takes place and having a volume such that, when the said assembly is at the thermal degradation temperature of the said binder, the gases resulting from the degradation of the binder are sucked up into the reservoir.

2. Assembly according to Claim 1, wherein the said mechanical part is a hollow turbomachine blade, in particular a fan rotor blade, and in that the said stack comprises three primary parts composed of a suction side primary part, a central plate and a pressure side primary part.

3. Assembly according to Claim 1, wherein said reservoir is made from a nickel-based or cobalt-based metal alloy.

4. Assembly according to Claim 1, wherein said volume

of the reservoir is between 10 and 100 times the volume of the said cavity in the stack .

5. Assembly according to Claim 1, wherein said  
5 reservoir is placed under a partial vacuum of between 0.01 and 0.1 Pa, preferably between 0.03 and 0.07 Pa.

6. Use of an assembly according to Claim 1, for  
extracting the gaseous residues present in a cavity  
10 that separates at least two primary parts intended to be joined together by diffusion bonding for the purpose of obtaining, after superplastic forming, a hollow mechanical part.

15 7. Process for manufacturing a hollow mechanical part by diffusion bonding and superplastic forming, comprising the following steps:

a) at least two primary parts are provided, said two primary parts having two faces and a periphery;

20 b) a stop-off product is deposited in a predefined pattern on at least one face among each pair of those faces of the said primary parts that are intended to face each other;

c) a sealed reservoir having an open end is  
25 provided, the said reservoir being produced so as to be non-deformable at the temperature and pressure at which the material of the said primary parts undergoes diffusion bonding;

d) said primary parts are joined together around  
30 their said periphery with the exception of a place forming a passage, the said primary parts forming a stack and defining, pairwise between them, a cavity that communicates with the said passage;

e) the stack and the reservoir are placed in a  
35 chamber under a partial vacuum of the chamber, thereby the internal volume of said reservoir is placed under a partial vacuum;

f) a sealed join is made between the said open end of said reservoir and the said passage of the said

stack in the said chamber under partial vacuum, so as to form an assembly allowing communication between the said internal space of the said reservoir and the said cavity;

5           g) said chamber is heated to the thermal degradation temperature of the said binder, thereby allowing the gases resulting from the degradation of the binder to be sucked into the reservoir ;

          h) said chamber is heated to the diffusion bonding  
10 temperature and pressurized to the diffusion bonding pressure, which causes said stack to undergo hot isostatic pressing diffusion bonding;

          i) said reservoir is separated from the bonded stack;

15           j) the said bonded stack is placed in a mould; and  
          k) the said mould is brought to the superplastic forming temperature and an inert gas is injected under the superplastic forming pressure via the said passage in the said cavity, whereby the stack undergoes  
20 inflation and superplastic forming, allowing a blank of the mechanical part to be obtained.

8.   Manufacturing process according to Claim 7, wherein said step d) for joining the primary parts and  
25 the said step f) for making the sealed join are carried out by electron beam welding.

9.   Manufacturing process according to Claim 7, wherein said partial vacuum is between 0.01 and 0.1 Pa,  
30 preferably between 0.03 and 0.07 Pa.

10. Manufacturing process according to any one of Claim 7, wherein said mechanical part is a hollow turbomachine blade, in particular a fan rotor blade,  
35 and wherein the said stack comprises three primary parts that are made up of a suction side primary part, a central plate and a pressure side primary part.